

AMAZONIANA	I	3	231—246	Kiel, Januar 1968
------------	---	---	---------	-------------------

(From: Max-Planck-Institut für Limnologie, Abt. Tropenökologie, Plön/H., Germany, and Station biologique du Laboratoire d'Evolution des Etres organisés, Les Eyzies, France)

Bryconops (Creatochanes) inpai, a new characoid fish from the Central Amazon Region, with a review of the genus *Bryconops*

by HANS-ARMIN KNÖPPEL, WOLFGANG JUNK and JACQUES GÉRY

While collecting around Manáus, one of us (J. G.)¹⁾, working together with Dr. E.-J. Fittkau, found an interesting specimen of an unknown *Creatochanes*-like species in a small brook running through the "Reserva Ducke", the research area of the Instituto Nacional de Pesquisas da Amazônia near Manáus. Later on, Dr. Fittkau returned to the spot and was able to secure a number of additional specimens, together with ecological data, which enable us to present the following description:

Bryconops (Creatochanes) inpai sp. nov.²⁾ (fig. 1b)

Holotype (fig. 1b): ♂, 94.8 mm in standard length (115.0 mm total length); lower Rio Negro region, Igarapé Barro Branco, a brook in the "Reserva Ducke" (INPA) about 30 km from Manáus, collected by Dr. E.-J. Fittkau, november 1965 (poisoned with "Pronox").

Allotype: ♀, 93.7 mm in standard length (112.2 mm total length); same locality, collected with the holotype.

Paratypes: 1 ♂, 83.2 mm in standard length, same locality, collected by J. Géry and E.-J. Fittkau, 25. 10. 1965 (poisoned with "Pronox"); 3♀ (19 ♂♂ and 20 ♀♀), 43.7—97.8 mm in standard length, same locality, collected with the type.

The holotype has been deposited in the Instituto Nacional de Pesquisas da Amazônia, Manáus, Brazil. The allotype and part of the paratypes are in the collection of one of us (J. G.) under the number 0501. The other paratypes are in the Max-Planck-Institut für Limnologie, Plön, Germany.

Diagnosis: A generalized *Creatochanes* with faint humeral spots, caudal lobes not conspicuously marked. Depth 3.10—3.54, head 3.47—3.95 in the standard length; eye 2.54—2.97, interorbital 2.90—3.40, maxillary 2.29—2.65, and snout (oblique) 3.0—4.1 in the length of head.

Anal iii 22—25; scales 7—8/45—46/3.5—4 (44—45 scales with pores, and one or two on the caudal basis); external premaxillary teeth in a "weavy" line, maxillary teeth 1—3, dentary 5—6 + 5—8 smaller ones.

¹⁾ During a research trip sponsored by the N.A.T.O. Foundation and the T.F.H. Fund.

²⁾ For Instituto Nacional de Pesquisas da Amazônia (I.N.P.A.) which placed the material at our disposal.

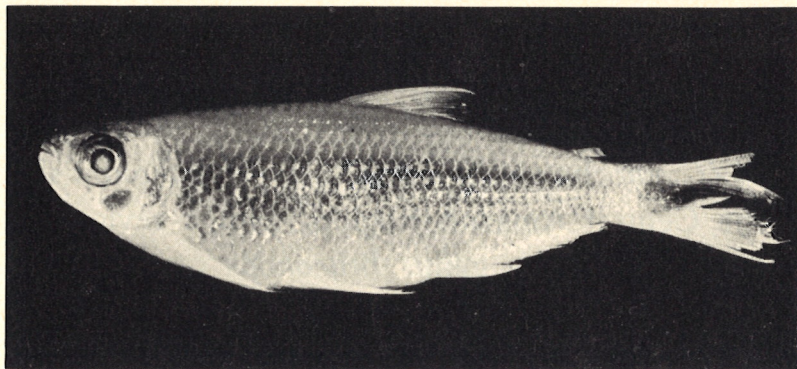


Fig. 1a. *Bryconops (Bryconops) caudomaculatus* 98 mm in standard length, Surinam

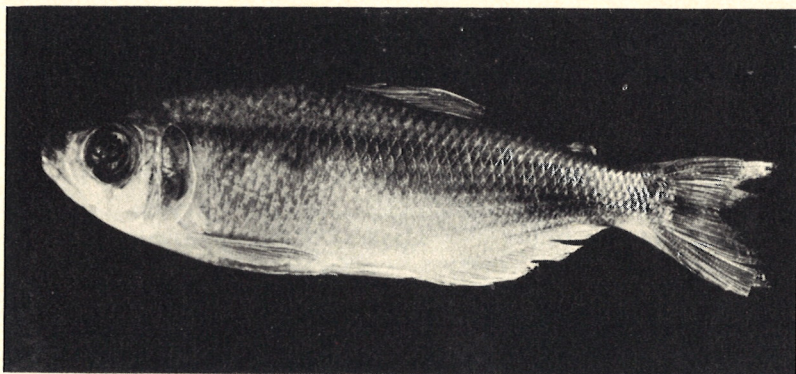


Fig. 1b. *Bryconops (Creatochanes) inpai* sp. nov., holotype 94.8 mm in standard length. Rio Negro basin

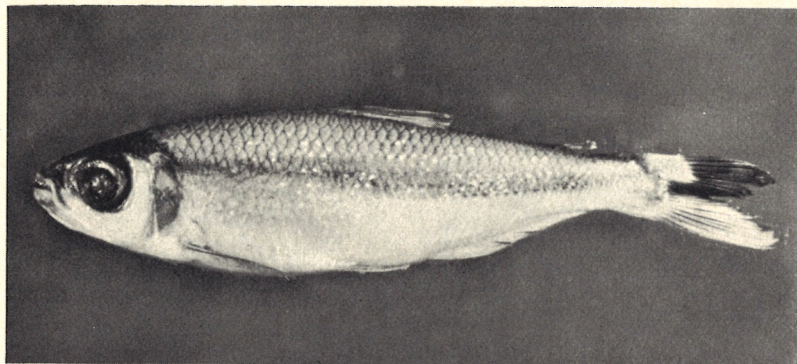


Fig. 1c. *Bryconops (Creatochanes) melanurus* 76 mm in standard length, Rio Negro basin

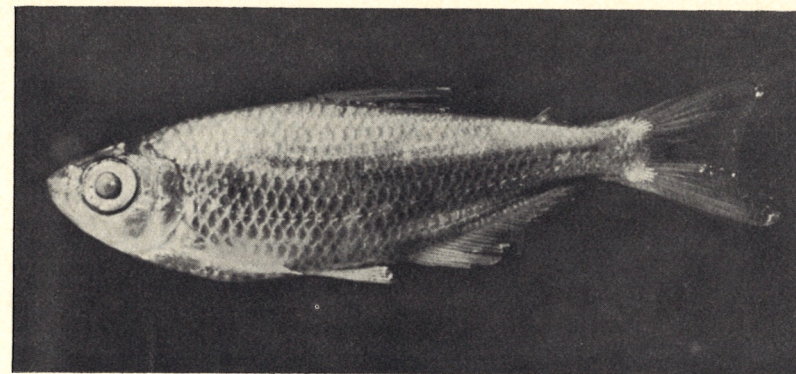


Fig. 1d. (*Creatochanes cyrtogaster*, Norman) cotypes, photograph British Museum, N. H., London (courtesy of Dr. P. H. GREENWOOD)

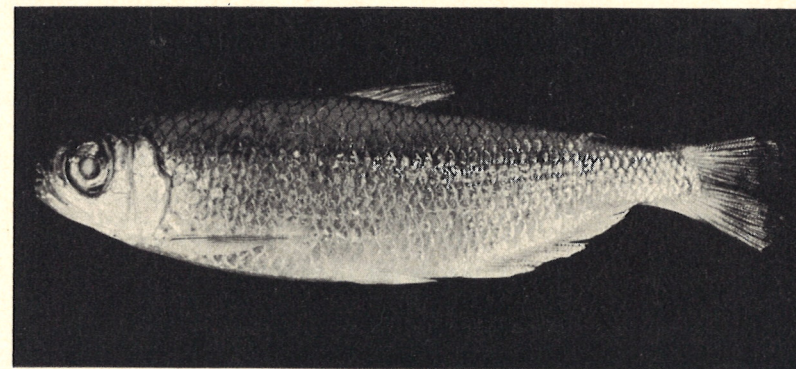


Fig. 1e. *Bryconops (Creatochanes) affinis* 104 mm in standard length, French Guiana

Counts and proportions of the holotype (allotype between parenthesis): Depth 3.18 (3.14) and head 3.96 (3.94) in the standard length; snout-to-dorsal 1.11 (1.10), in dorsal-to-caudal; depth of peduncle 1.27 (1.58) in its length; eye 2.74 (2.72), interorbital 2.91 (2.90), maxillary (apparent length) 2.56 (2.59), and snout 3.23 (3.23) in the length of head. Dorsal ii 9 (ii 9), anal iii 24 (iii 23); scales 8/46/4 (7/46/3.5), 11 (10) in predorsal regular line, 18 (18) around peduncle; sexual hooks i 20/6—14 (none).

Description and variability (see Table I for the principal proportions and counts of the 16 largest specimens): body fusiform, relatively deep (concerning a *Creatochanes*), the greatest depth in front of the ventrals. Depth (in standard length) 3.08—3.60 (juv.), mean 3.27 ± 0.066 ($N = 41$, $s = 0.42$); there is a positive allometry (see later on). Peduncle longer than deep, its depth 1.27—1.66 in its length; dorsal fin in the middle, or slightly in advance of the middle of the body (snout-to-dorsal 1.04—1.26 in dorsal-to-caudal); pectorals not very short, their tips often reaching to ventrals or near to them, ventrals originating just in front of dorsal, reaching to first ray of anal; anal relatively short, beginning just after the level of the last dorsal ray and ending under

	holotype		allotype															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	ranges	
Sd. lgth. (mm)	94.8	97.8	93.7	90.0	89.8	87.0	85.0	83.8	83.4	80.6	79.5	67.3	64.9	61.2	58.9	53.6	53.6—97.8	
Sd. lgth./depth	3.18	3.14	3.14	3.29	3.25	3.22	3.16	3.21	3.22	3.29	3.21	3.38	3.29	3.15	3.54	3.41	3.14—3.54	
Sd. lgth./head	3.96	3.79	3.94	3.87	3.93	3.95	3.84	3.89	3.75	3.73	3.75	3.73	3.70	3.47	3.61	3.64	3.47—3.96	
Head/eye	2.74	2.97	2.72	2.86	2.81	2.75	2.76	2.68	2.74	2.54	2.86	2.96	2.91	2.79	2.62	2.77	2.54—2.97	
Head/interorb.	2.91	2.77	2.90	2.96	3.04	2.97	2.98	2.90	2.96	2.95	2.90	3.17	3.36	3.25	3.19	3.19	2.77—3.36	
Head/maxillary	2.56	2.65	2.59	2.57	2.32	2.58	2.51	2.38	2.61	2.60	2.55	2.54	2.29	2.41	2.46	2.29	2.29—2.65	
Head/snout	3.23	3.44	3.23	3.26	3.47	3.79	3.87	3.00	3.47	3.37	3.31	4.11	3.30	3.59	3.46	3.41	3.00—4.11	
D.-C./S.-D.	1.11	1.13	1.10	1.17	1.04	1.15	1.15	1.06	1.12	1.10	1.07	1.11	1.11	1.14	1.14	1.26	1.04—1.26	
Dorsal	ii 9	ii 9	ii 9	ii 9	ii 9	ii 9	ii 9	ii 9	ii 9	ii 9	ii 9	?	ii 9	ii 9	?	?	ii 9	
Anal	iii 24	iii 25	iii 23	iii 23	iii 24	iii 25	iii 24	iii 23	iii 24	iii 22	iii 22	iii 24	iii 24	iii 25	iii 23	iii 23	iii 22—25	
Ped. lgth./depth	1.27	1.27	1.58	1.55	1.52	1.54	1.30	1.36	1.59	1.48	1.41	1.63	1.45	1.55	1.64	1.66	1.27—1.66	
Scales lat.	46 (45)	45 (44?)	46 (45)	46 (45)	46 (44)	46 (44?)	46 (45)	47? (46)	46 (45)	?	44? (43?)	46 (45)	46 (45)	46 (44)	46 (45)	46 (45)	45—46 (44—45)	
Scales transv.	8/4	7/3.5	7/3.5	7/3.5	7/3.5	7/3.5	7/3.5	7/3.5	7/3.5	8/4	7/3.5	8/4	7/4	7/4	7/4	8/4	7—8/3.5—4	
Scales predors.	11	10	10	10	11	12	11	11	12	11	11	10	10	10	?	10	10—12	
Scales pedunc.	18	17	18	17	19	18	?	17	18	16	16	16	16	16	16	18	16—19	
Ext. pmx. teeth	6/5	5/4	5/6	5/5	5/4	5/4	5/5	5/5?	5/5	5/4	5/5	5/4	5/5	5/4	5/5	5/5	5—6/4—6	
Int. pmx. teeth	4/5	5/5	5/5	5/5	6/5	5/5	4/5	5/5	5/5	5/5	5/5	6/5	5/5	6/6	5/5	5/5	4—6/5—6	
Mx. teeth	3/3	2/2	3/3	2/1	3/2	2/2	2/2	2/2	3/2	2/3	2/2	2/2	2/1	2/2	1/2	2/1	1—3/1—3	
Dn. teeth	6/6 + 6/6	6/6 + 6/8	6/6 + 4/5	5/5 + 7/7	6/6 + 7/6	5/5 + 5/7	5/5 + 7/7	5/5 + 7/7	6/6 + 5/5	5/5 + 8/7	5/6 + 6/5	5/5 + 6/3	5/5 + 6/6	5/6 + 6/5	5/5 + 5/5	5/5 + 2/4	5—6 + 5—8*)	
Hooks	21/6—14	♀	♀	21/6—15	♀	21/6—15	?	♀	♀	22/6—14	22/6—20	?	?	?	?	?	21—22/6—20	
Gill-rakers	10/6—7	9/7?	?	10/7	9/?	9/7	9/7?	9/?	10/7	9/7	10/6	?	?	?	?	?	9—10/6—7	

*) The counts of teeth was the same on both sides of dentary

Table I: Principal proportions and counts of 16 specimens of *Bryconops (Creatochanes) inpai* sp. nov. (head without membrane, vertical diameter of eye, bony interorbital, teeth counted separately on the left and right side; number of anal rays with hooks, and number of hooks on each ray, presumably in males only).

adipose level; a number (6—20) of tiny hooks from the last unbranched ray to the 20th—21st branched ray of anal, presumably on males only (21 specimens). Caudal not scaled, the lower lobe apparently longer than the upper one. A scale (fig. 3), taken on the flank above the ventral level (under the lateral line), shows the following characteristics: length/depth ratio 0.77 in the average, i. e. the scale clearly deeper than long; basal border bilobed, apical border strictly smooth as in most Tetragonopterinae; nucleus moderate, central; numerous circuli in the basal field, strongly diverging near the apical field, where they disappear almost behind the nucleus level; real radii none; instead a number of irregularly set, very distorted, grooves which apparently are characteristic for the species (see discussion), at least in specimens about 60 mm or more in standard length. Predorsal line with a regular serie of 10—12 scales; 16—18 scales around peduncle.

Head compressed and short, but not so short as in the other species; head (in standard length) 3.47—3.97 (adult), mean 3.75 ± 0.021 ($N = 41$, $s = 0.14$); eye large, rather distal; profile of the snout almost as long as eye-diameter, adipose lid moderate; maxillary with an anterior curve, typical of the genus or subgenus *Creatochanes* (see discussion), its tip not reaching the suture between 2nd and 3rd suborbital (or the quadrato-mandibular articulation which is at the same level as the said suture), and not to the level of the middle of pupil (fig. 2); maxillary (in length of head) 1.84—2.70 (juv.), mean 2.48 ± 0.026 ($N = 41$, $s = 0.17$); anterior fontanel rather short, not reaching the level of the front of pupil; great suborbital almost covering the cheek; teeth rather heavy, 4—6 tricuspid ones in the outer row of the premaxillary, the 3rd one generally

displaced backwards and almost forming a rudimentary middle row, the other ones rather irregularly set; 5—6 quincuspid teeth in the inner row; 1—3 tri- to quincuspid teeth at maxillary angle; 5—6 large, quincuspid teeth in front of each side of dentary, followed on each side by 5—8 much smaller, conical ones. 9—10 / 6—8 gill-rakers, the first and the last ones quite rudimentary.

Differential growth (fig. 4a + b): the logarithms of the following distances: largest depth, length of head (without membrane), snout-to-dorsal, interorbital width, apparent length of maxillary, and vertical diameter of eye (in the ordinate) have been plotted against the logarithms of the standard length (in the abscissa), and the regression lines have been approximated by eye. The regression coefficient thus appreciated is supposed to be a fairly good representative of the allometry constant α (cf. GERY, 1965: 270—280). The depth shows clearly a positive allometry ($\alpha = 1.15$); the head and eye, as rather frequently in the Tetragonopterinae, a negative one ($\alpha = 0.9$ for the head, very likely to be around 0.75 for the eye). The dorsal fin seems to “migrate” slightly forward during the growth, i. e. the distance snout-to-dorsal has a very slight negative allometry ($\alpha = 0.95$).

In spite of a relatively great variability, one may assume that the interorbital presents a positive allometry, with a suspected “critical point” at log .920 (80—85 mm): 1.1 or 1.15 and probably 1.3 up to the largest recorded length (97.8 mm). Finally the most important allometry, as it is pertinent to the diagnosis of the species (and also to the differential diagnosis of the species of the group) is the length of maxillary, which appears as strongly negative ($\alpha > 0.75?$).

Colour pattern rather unusual for a *Creotochanes*. In life, a bluish iridescence along the body, mostly along a 2—3 scales-wide longitudinal band spreading over the lower half of the peduncle; the fins are not brilliantly coloured, and the caudal shows no red, yellow or black spot or band. After preservation in formalin, a dark longitudinal band spreading over the lower half of the peduncle, running anteriorly to the level of dorsal; two dark humeral spots. The body is homogeneously brownish coloured above the longitudinal line. Both caudal lobes dark, the middle rays forming a rather dark band, not conspicuous as in most other *Creotochanes*-forms. Juvenile specimens (not designated as paratypes) have a rather different colour-pattern, mostly characterized by a dark line above anal-base, and a dark longitudinal band.

Biological and ecological data: The fishes were caught in the Igarapé Barro Branco, a 2—3 meters broad rain-forest stream, typical to the "terra firme" region of Central-Amaonia. The water is characterized by the low value of the pH, the poverty of electrolytes, and the more or less brownish coloration due to colloidal humus substances. (See FITTKAU, 1964.)

		γ/l		γ/l	
$\times (\mu S_{20})$	9.2	Si	2280	Na	847
pH	4.5	N	637	K	721
Hufa	30	N (NO ₃)	11.1	Mg	18
O ₂ — saturation	75%	P	11.05	Ca	0.00
free CO ₂ (mg/l)	30.0	SO ₄	120	Fe	54
temp. water (°C) \pm	24.5	Cl	356	Al	278

Table II: Analysis of a rain-forest-stream in the Central-Amaon-Region
("Reserva Ducke" INPA, near Manaus)

A sample of water, taken by E.-J. Fittkau in 1961, was analysed by the M.-P.-I. für Limnologie, and the data are recorded in Table II. As the water is extremely poor in soluble minerals, and the light scarce, plant-life is missing as well as most of the lower fauna which follows it in the nutrition-cycle. Thus the higher organisms living in the brook (mostly Decapods and Fishes), depend only on allochthonous material, dropped from the trees across the water or washed in by the rains.

The stomach of 15 dissected specimens of *B. inpai* contained approximately 70% of terrestrial insect remains: some Ephemeroptera and Termites and many Hymenoptera. The ants are preponderant; two species at least could be recognized, but not identified, viz a small, abundant form, which is brownish to yellow, and a larger one, much less abundant, which is brown to black. Trichoptera larvae seemed to be the only true aquatic food. In a few fishes, vegetal remains were rather abundant, composed mostly by some flowers and seeds.

B. inpai was associated with the following forms (recording only those forms taken with poison along 300 m or so):

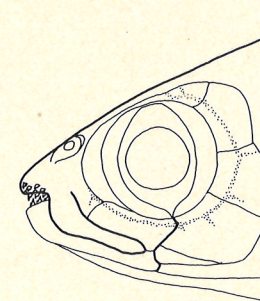
Characoidei: 2 *Hemigrammus* spp., *Pyrhulina brevis*, and *Erythrinus erythrinus*.

Gymnotoidei: *Rhamphichthys* sp. and *Gymnotus carapo*.

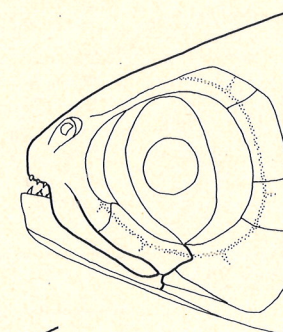
Siluriformes: *Callichthys callichthys* and *Loricaria* sp.

Cichlidae: *Crenicichla* sp. and *Aequidens* sp.

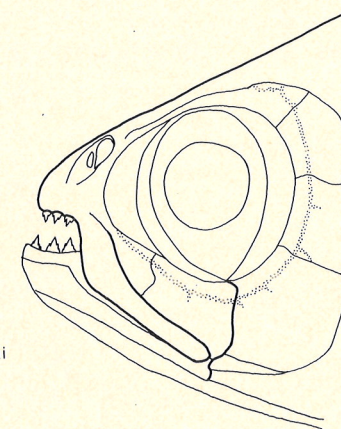
Bryconops (B.) *alburnoides*



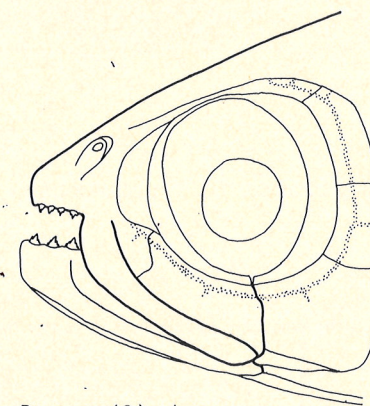
Bryconops (B.) *caudomaculatus*



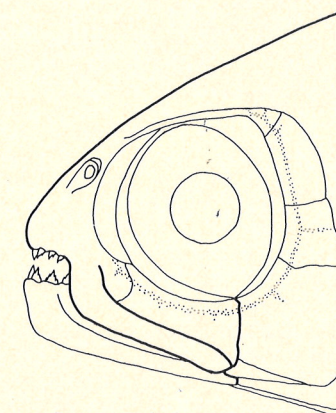
Bryconops (C.) *inpai*



Bryconops (C.) *melanurus*



Bryconops (C.) *affinis*



10 mm

Fig. 2. Drawings of heads (profile, maxillary, and suture between 2nd and 3rd suborbital marked by heavy lines).

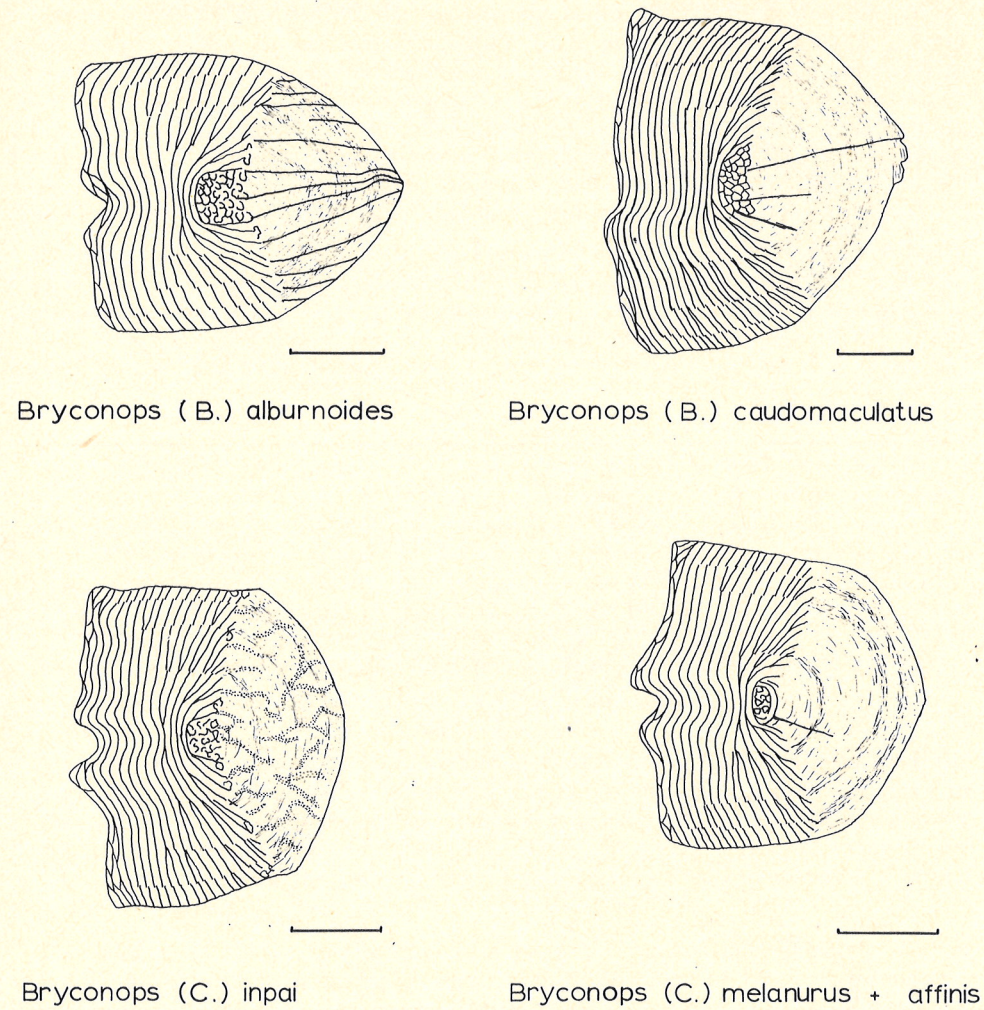


Fig. 3. Scales (taken from the left flank of the fish); the structure of the scale does not differ in *B. melanurus* and *B. affinis*.

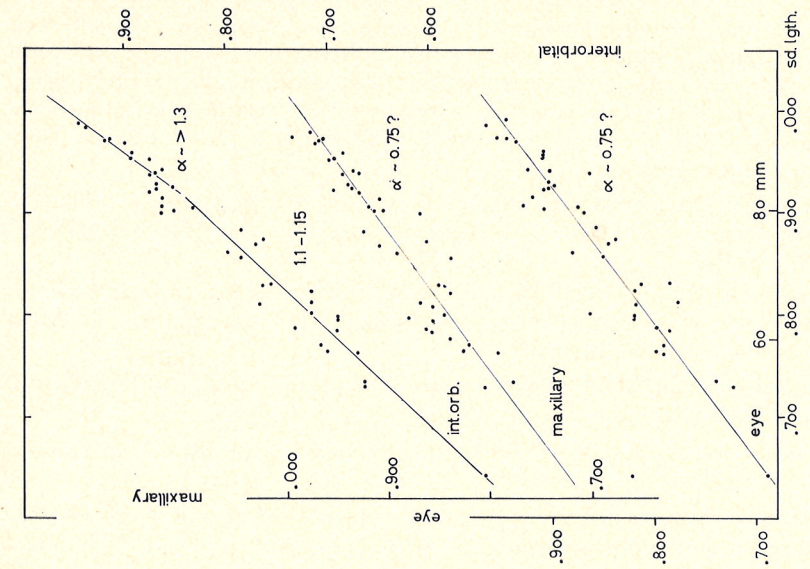


Fig. 4b. *Bryconops inpai* sp. nov., 41 specimens: vertical diameter of eye, apparent length of maxillary, and bony interorbital (ordinate) plotted against standard length (abscissa); logarithmic coordinates. — To note the positive allometry of the interorbital, and the negative one of the maxillary.

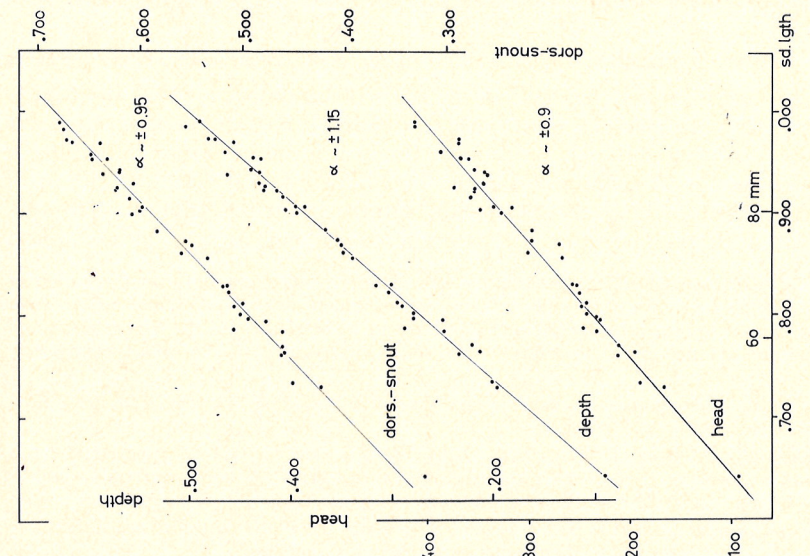


Fig. 4a. *Bryconops inpai* sp. nov., 41 specimens: largest depth, length of head, and distance snout-to-dorsal (ordinate) plotted against standard length (abscissa); logarithmic coordinates. — To note the positive allometry of the depth

Discussion and review of the genus

In spite of its colour-pattern *B. inpai* sp. nov. belongs to the genus *Creatochanes* sens. auct., according to the following characters: (1) elongate body-form; (2) relatively long maxillary forming, near its beginning, a strong curve, almost at a right angle; (3) transverse rows of scales, relatively to the depth of the body, numerous, lateral line running along the lower third of the body, lateral line complete; (4) two rows of multicuspid teeth on premaxillary, the inner row of no less than 5 teeth on each side, caudal lobes not scaled, adipose fin present etc.

In order to evaluate its morphological affinities, we compared it with a number of specimens of different forms as following (nomenclature after EIGENMANN & MYERS, 1929) (see Table III):

Creatochanes melanurus (Bloch, 1795), type-species, 88 specimens from Upper Juruena, Rio Negro basin, Rio Peixe Boi (Pará), Lago Grande de Manacapuru, Rio Meta (Columbia), French Guiana, Surinam;

Creatochanes affinis Günther, 1864, 47 specimens from Upper Juruena, Rio Negro basin, French Guiana, British Guiana, Surinam;

Creatochanes caudomaculatus Günther, 1864, 18 specimens from Rio Negro basin, French Guiana, Surinam;

We were able to study also a specimen of *Bryconops alburnoides* Kner, 1859, collected by W. R. Allen, 1920, in the Upper Amazon.

Unfortunately, no specimens of the following species, apparently pertinent to the discussion, were available:

Bryconops lucidus Kner, 1859, Amazon basin;

Creatochanes gracilis Eigenmann, 1908, known from a single specimen from Rio Tapajós;

Creatochanes cyrtogaster Norman, 1926, apparently an endemic form from the Oyapok basin in French Guiana, of which Dr. P. H. Greenwood was kind enough to send us the photographs of the types. (fig. 1d)

Brycochandus durbini Eigenmann, 1908, only known from two small specimens from Rio Tapajós¹⁾;

Antanichthys giacopini Fernandez-Yepez, 1950, from Rio Autana in Venezuela²⁾;

(1) *Creatochanes caudomaculatus* (fig. 1a), in the sense of EIGENMANN (1912) and EIGENMANN & MYERS (1929), the species is most easily to identify: it has, almost always, 6 scales above lateral line (counting obliquely from under the first dorsal ray to the lateral line); in only one specimen (in 18 examined specimens), we have found 7 scales. The tip of the maxillary is never reaching the SO₂—SO₃ suture. Branched anal rays 28—30, never less³⁾. Although the scale (fig. 3)⁴⁾ is deeper than long, as in *C. melanurus* and

¹⁾ *Brycochandus* is characterized by the incomplete lateral line, which runs only on three-quarter of the sides. This may be a juvenile character: in 10 young specimens of *cf. Creatochanes caudomaculatus* (Rio Jufari, largest about 49 mm), the lateral line pores are to be seen only on the first scales (total 40—42). If not for the absence of the maxillary teeth, those specimens could be called *Brycochandus durbini*.

²⁾ We do not believe that *Ramirezella newboldi* Fernandez-Yepez, 1949 (1 specimen from Edo. Guarico, Venezuela) belongs to the group.

³⁾ The type from "South America" (GÜNTHER, 1864 : 330) is said to have 26 rays (total): this raises serious doubt concerning EIGENMANN's identification of the British Guiana material, which is said to have 28—31 anal rays. Our material is unquestionably *caudomaculatus* of EIGENMANN.

⁴⁾ The figures in COCKERELL (1914, plates 26 and 27), made from photographs, are difficult to interpret. We found useful to duplicate them with semi-schematic sketches.

Table III

Principal proportions and counts of the species of the genera *Bryconops* and *Creatochanes* sens. auct. (nomenclature after EIGENMANN & MYERS, 1929).

	<i>Bryconops alburnoides</i>	<i>Creatochanes -gracilis*</i>	<i>Creatochanes caudomaculatus</i>	<i>cf. caudomaculatus</i> (Rio Jufari)	<i>Bryconops inpai</i> sp. n.	<i>Creatochanes melanurus</i>	<i>Creatochanes affinis</i>
Sd. lgth. (mm)	99.3	75.0	44.6—96.7	41.0—48.9	43.7—97.8	81.3—111.3	89.4—108.5
Sd. lgth./depth	4.20	4.50	3.03—3.35	4.00—4.41	3.10—3.54	3.48—3.67	3.34—3.73
Sd. lgth./head	4.71	4.33	4.10—4.93	4.00—4.41	3.47—3.95	4.29—4.55	4.08—4.42
Head/eye	2.93	?	1.92—2.58	2.04—2.52	2.54—2.79	2.50—2.80	2.24—2.76
Head/interorb.	3.06	?	2.34—3.07	2.84—3.29	2.90—3.36	2.58—2.82	2.38—2.86
Head/maxillary	2.76	2.50	2.36—3.17	2.63—3.36	2.29—2.65	2.20—2.32	2.16—2.48
Head/snout	3.15	?	3.27—3.72	?	3.00—4.11	3.33—3.50	3.17—3.76
D.-C./S.-D.	1.17	> 1.0	1.07—1.36	?	1.04—1.26	1.12—1.16	1.13—1.19
Pedunc. lgth./depth	?	?	1.17—1.75	?	1.27—1.66	1.25—1.92	1.44—1.90
Dorsal	ii 8	ii 9	ii 9	ii 9	ii 9	ii 9	ii 9
Anal	iii 33	iii 31.5	iii 28—30	iii 28	iii 22—25	iii 25—27	iii 23—25
Scales lat. line	57	54	43—45	40—42 (36)	45—46	43—46	43—46
Scales transv.	8/3	8/3.5	6/3—4	7/3	7—8/3.5—4	7/3	7.5/3
Ext. pmx. teeth	5/5	4	3—5/4—5	5 (or 3 + 2)	5—6/4—5	3—5/3—4	4—5/4—5
Mid. pmx. teeth	2/2	—	—	—	—	—	—
Int. pmx. teeth	5/5	5	5/5	5/5	4—6/5—6	5—6/5—6	5/5
Mx. teeth	0/0	0	0—1/0—1	0/0	1—3/1—3	2/2	2/2
Dn. teeth	5/5	5	5/5	5/5	5—6/5—6	5/5	5—6/5—6

*) only known to us from literature

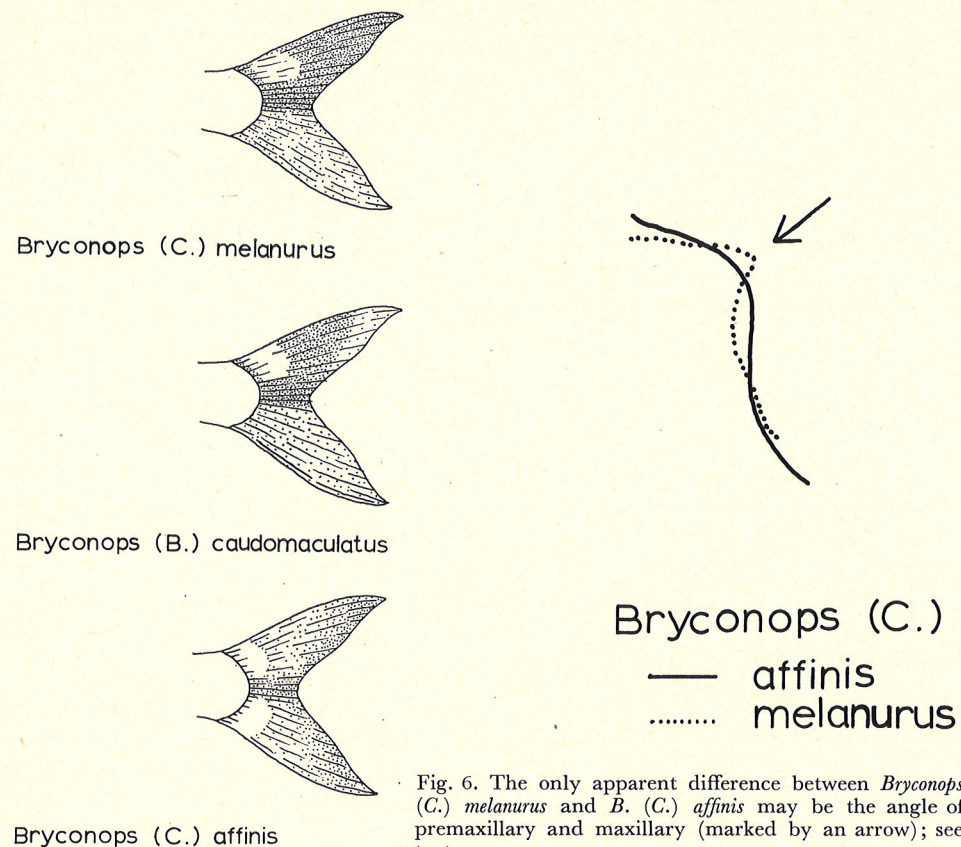


Fig. 6. The only apparent difference between *Bryconops* (C.) *melanurus* and *B. (C.) affinis* may be the angle of premaxillary and maxillary (marked by an arrow); see text.

Fig. 5. Pattern of caudal lobes, schematic drawings (originals show great variability).

C. affinis, it is more similar to that of *Bryconops* in the form of the distal upper and lower border, which are evenly curved, without angles, as well as in the number of radii (though not as numerous as in *B. alburnoides*, fig. 3); the profile of the head (fig. 2) is somewhat intermediary between *melanurus* and *affinis*, whereas the maxillary length is definitively on the *Bryconops* "side"; another convergency with *Bryconops* is the almost constant absence of teeth on maxillary: in only two instances (in 18 examined specimens) there is one tooth on each side. The colour-pattern of the caudal is rather characteristic: the black band on the upper caudal lobe, surrounding the red spot (in vivo), is rarely reaching the tip of the lobe (fig. 5).

(2) The sympatric species *Creatochanes melanurus* and *C. affinis* are extremely difficult to separate. We doubt if it would be possible to identify half-grown specimens (less than 60 mm) on morphological grounds. Both species have the same meristics, proportions, form of maxillary, scale structure, etc. The colour-pattern of the tail, at least in preserved specimens, is rarely of great use. Using our best preserved specimens in com-

parison with EIGENMANN's (1912) plate 50, it was nevertheless possible to state what Eigenmann, who had seen and designed the type of *melanurus*, believed to be respectively *melanurus* and *affinis* (in spite of some discrepancies¹⁾ in the key, published at the same time, as well as in EIGENMANN & MYERS, 1929). Working by degrees, we were finally able to find that the profiles of the head of mature specimens (fig. 2) are different: in *C. melanurus* the profile of the snout is almost straight, the premaxillary curve (which is typical of the "genera" *Bryconops*, *Creatochanes*, etc.) is very accentuated at the front part of the bone (fig. 6), forming with the premaxillary an angle of 45° or less, this angle generally above an horizontal line through the pupil. In *C. affinis* (fig. 2 and 6) the profile of the snout is generally rounded, the premaxillary is high, without a "tip", the maxillary curve is forming an angle of more than 45° with the premaxillary, this angle being generally below the level of the middle of the pupil.

Although we were unable to quantify those differences, we have found that, generally, a perpendicular of a straight line, through nares and maxillary tip, enters the superior profile of the snout in *C. melanurus*, whereas this perpendicular is well above the superior profile of the snout in *C. affinis*.

These characters enable us to doubt the identification of the figure 5, plate 2 in EIGENMANN (1917), a profile of the head labeled *Creatochanes affinis*, which seems to be *C. melanurus*. We identify also as "true" *melanurus* a number of specimens from the Amazon basin (fig. 1), and we do not believe that *melanurus* is restricted to the Guianas as stated in EIGENMANN & MYERS (1929), accordingly, we do not question the record of *C. melanurus* from Obidos and Rio Tapajós, made by STEINDACHNER (1875 and 1915, respectively plate 2 fig. 7 and plate 1 figs. 5-6), as did EIGENMANN & MYERS (1929 :437).

(3) Judging from the examination of a single specimen of *Bryconops alburnoides* Kner, 1859, type-species of the genus, the differential characters with the above discussed species are the following: head (fig. 2) more pointed, the snout apparently longer in profile, the maxillary (short and without teeth as in *caudomaculatus*) forming an angle almost as pronounced as in *melanurus*, and almost horizontal in direction; the outer premaxillary teeth very irregularly set: the two teeth which are displaced backwards, apparently coming from the outer row, may be well described as a middle row. The scales and anal rays are clearly more numerous; the structure of the scale (fig. 3) is rather near to that of *caudomaculatus*, but much more elongated (ratio length-to-depth about 1.1), with numerous radii. Judging from most used standards in Tetragonopterinae, those differences are scarcely of a generic nature; several overlappings of characters are involved: the snout is rather pointed in *melanurus*; the maxillary is often without teeth in at least two "*Creatochanes*"-species, *caudomaculatus* and *gracilis*; in several small specimens of *cf. caudomaculatus* from Rio Jufari (into Rio Negro), we found a disposition of the teeth which is near to that of *Bryconops*, with two teeth rather strongly displaced backwards and forming a rudimentary "middle series"; the scales in lateral line are more than 50 in "*Creatochanes*" *gracilis*, the branched anal rays are more than 30 in, at least, *C. gracilis*, and perhaps in some *C. caudomaculatus*.

Two rather natural groups emerge from the preceding discussion. In the former one, we found species with relatively short, rarely toothed maxillary, and long anal fin (branched rays 28—35). These belong apparently to *Bryconops* nominal, and would comprise *alburnoides*, *lucidus*, *gracilis*, and *caudomaculatus*. The second group comprises

¹⁾ See GERY, 1966.

only the "sibling" species *melanurus* and *affinis* (fig. 1c+e)¹⁾, which have a rather regular outer row of premaxillary teeth, a long, always toothed maxillary, and few branched anal rays (23—29). They belong to *Creatochanes* nominal which, we believe, cannot be accepted at a full generic level, but can be maintained, for convenience, as a subgenus of the older taxon *Bryconops*.

Another argument for the lumping of both genera is the discovery of the new form *inpai* which, in a sense, "bridges the gap" between *Bryconops* and *Creatochanes*: the length of the maxillary is intermediate between that of *B. alburnoides* and that of *B. melanurus*; it is always toothed (1—3), but the external premaxillary row of teeth is always irregularly set, with one tooth (rarely two), strongly displaced backwards; the scales of lateral line and the branched anal rays are not numerous as in *melanurus*, but the transversal scales above lateral line are rather frequently (about 25%) as numerous as in *Bryconops* sens. str., viz 8, whereas in *melanurus-affinis* it is very generally 7.

In the structure of the scale, the relative length of the head and the generalized colour-pattern, *B. inpai* is strongly different either from *Bryconops* sens. str. and from *Creatochanes* sens. str. We believe, nevertheless, that it is, in the whole, decidedly on the *Creatochanes* "side".

This can be summarized in the following speculative key:

- a. Maxillary short, its tip not reaching to the suture between 2nd and 3rd suborbital (see also *B. inpai* sp. nov.), rarely toothed; branched anal rays 28—35 (*Bryconops* nominal)
 - b. Head rather pointed, the maxillary never toothed, almost horizontal; outer premaxillary teeth irregularly set, some teeth (generally 2) forming an incipient middle series; scales 8 (9?) / 55—62 / 3—4; branched anal rays 30—36; scales quite elongate, with numerous radii
Bryconops (Bryconops) alburnoides and *lucidus*
 restricted to the Amazon basin?
 - bb. Head more rounded, the maxillary occasionally toothed; outer premaxillary teeth with occasionally one backwards displaced tooth.
 - c. Depth 4.5 in standard length; scales 8 / 54? / 3; branched anal rays probably 31, middle rays and distal part of upper caudal lobe dark
Bryconops (Bryconops) gracilis, Rio Tapajós
 - cc. Depth less than 4.5 in standard length; scales 6 (very rarely 7) / 43—45 / 3—4; branched anal rays 28—30; a red spot on the base of upper caudal lobe surrounded by a black one, the latter generally not reaching to the tip of the lobe: (fig. 5); (depth 3.0—3.4, head 4.1—4.9 in standard length; maxillary 2.3 — 2.7 in length of head (adults), true radii generally present)
Bryconops (Bryconops) caudomaculatus
 Guianas and Amazon basin
 - (ccc.) Lateral line incomplete; maxillary teeth said to be numerous
Bryconops (Bryconops) durbini, Rio Tapajós
- aa. Maxillary rather short, its tip not reaching the suture between the 2nd and 3rd suborbital, but always toothed; branched anal rays 23—25; scales in adults without true radii, but with numerous, irregularly set grooves (fig. 3); head 3.4—

3.9 in standard length; two humeral spots (in formalin); no spot on upper caudal lobes, a band above anal and lower part of peduncle, ending in a black zone on the middle caudal rays, bluish in vivo; (scales 7—8 / 45 — 46 / 3.5—4, depth 3.1—3.54 in standard length, maxillary 2.29—2.65 in length of head, with 1—3 teeth)

Bryconops (Creatochanes) inpai sp. nov.

Rio Negro basin (Central Amazon Region)

- aaa. Maxillary long, its tip reaching to the suture between the 2nd and 3rd suborbital, always toothed; branched anal rays 23—27 (29 in *cyrtogaster*?), scales in adults generally with a few, very short radii, without irregularly set grooves; no true humeral spots; caudal lobes always marked; (scales 7—8 / 43—46 / 4, depth 3.3—3.8 (3.0 in *cyrtogaster*), head 4.0—4.5 in standard length)
 - d. Head rather pointed, with a long snout and a slender dentary, upper profile almost straight (fig. 2); colour-pattern of the upper caudal lobe as in *caudomaculatus*, except that the black band generally extends up to the tip; lower caudal lobe always plain (fig. 5)
Bryconops (Creatochanes) melanurus
 Guianas, Amazon, Rio Negro, Orinoco
 (? branched anal rays 28—29, depth 3.0 in standard length
B. (C.) melanurus cyrtogaster, Oyapok)
 - dd. Head obtuse, snout short, dentary heavy, upper profile roundish; both caudal lobes dark, the upper one darker; the spot at the upper caudal lobe base often yellow in vivo (more rarely red) (fig. 5)
Bryconops (Creatochanes) affinis
 Guianas, Amazon and Rio Negro, Paraguay

Resumo

Descreve-se uma nova espécie de peixes Characidae, *Bryconops (Creatochanes) inpai*. Distingue-se a mesma das outras espécies, até agora conhecidas, daquele gênero pelas seguintes características: comprimento menor do osso maxilar, estrutura das escamas sem raios verdadeiros, duas manchas espaduais (em animais conservados em formalina).

Com uma série de características (comprimento dos maxilares, denteação dos maxilares; 1 dente da linha externa do premaxilar é sempre retroposto para dentro de uma „linha média“; número e estrutura das escamas), *B. inpai* ocupa uma lugar intermediário entre as espécies dos dois gêneros *Bryconops* e *Creatochanes*.

Por isso, não se mantém mais a separação das espécies em dois gêneros, mas reúnem-se ao mesmas dentro de um gênero só: *Bryconops* (como a denominação mais antiga).

Uma comparação das espécies dos — até então — dois gêneros revela a existência de dois grupos com valores somente sub-genéricos. 1) *Bryconops* nominal (com maxilar relativamente curto e raras vezes denteado, com barbatana anal comprida): (*B.*) *lucidus*, (*C.*) *gracilis*, (*C.*) *caudomaculatus*. 2) *Creatochanes* nominal (com maxilar mais comprido, sempre denteado; linha externa dos dentes no pre-maxilar sem um dente retroposto; (*C.*) *melanurus*, (*C.*) *affinis*).

Os resultados da revisão são reunidos numa provisória chave de determinação.

¹⁾ *Creatochanes cyrtogaster* NORMAN, 1926, appears to us provisorily as a geographical subspecies of *melanurus*, with a slight increase of the number of branched anal rays, and a deeper body.

References

- COCKERELL, T. D. A., 1914: The scales of the South American characinid fishes. — *Ann. Carn. Mus.* 9, No 1—2: 92—113, pls. 23—28.
- EIGENMANN, C. H., 1908: Preliminary descriptions of new genera and species of the tetragonopterid characins. — *Bull. Mus. Comp. Zool. Harvard Coll.* 52 (6): 91—106.
- EIGENMANN, C. H., 1912: The fresh-water fishes of British Guiana, including a study of the ecological grouping of species, and relation of the fauna of the plateau to that of the lowlands. — *Mem. Carn. Mus.* 5: 1—578 and plates.
- EIGENMANN, C. H., 1917: The American Characidae, part 1. — *Mem. Mus. Comp. Zool. Harvard* 42: 1—102, 16 plates.
- EIGENMANN, C. H. & MYERS, G. S., 1929: The American Characidae, part 5. — *Mem. Mus. Comp. Zool. Harvard*, 43: 429—515 and 516—558 (by Myers supplemented).
- FERNANDEZ-YEPEZ, A., 1949: *Ramirezella newboldi*, nuevo genero y especie de pez Tetragonopterinae coletado en Venezuela. — *Evencias—Venezuela* (6): 1—3.
- FITTKAU, E.-J., 1964: Remarks on limnology of central Amazon rain-forest streams. — *Verh. Internat. Verein. Limnol.* 15: 1092—1096.
- GÉRY, J., 1965: Sur trois Approximations statistiques appliquées à la Zoologie courante. — *Bull. biol. France et Belgique*, 99 (2): 249—281.
- GÉRY, J., 1966: Notes on characoid fishes collected in Surinam. — *Bijdragen tot de Dierkunde* 35 (1965): 101—126, 2 plates.
- GÜNTHER, A., 1864: Catalogue of the fishes in the British Museum 5: 278—380.
- NORMAN, J. R., 1926: Descriptions of nine new fresh-water fishes from French Guiana and Brazil. — *Ann. Mag. Nat. Hist.* 9^e serie, 18: 91—97.
- STEINDACHNER, F., 1875: Beiträge zur Kenntnis der Characiden Amazoniens. — *Sitz.berichte kaiserl. Akad. Wiss., Wien* 72.
- STEINDACHNER, F., 1915: Beiträge zur Kenntnis der Flußfische Südamerikas V. — *Denkschrift kaiserl. Akad. Wiss.* 93: 1—92.

Authors' addresses:

H.-A. Knöppel

W. Junk

Max-Planck-Institut für Limnologie

Abt. Tropenökologie

Plön/Holstein (Germany, Fed. Rep.)

J. Géry

Station biologique du Laboratoire

d' Evolution des Etres organisés

24 — Les Eyzies (France)